

DISCOVERY OF A LOWLAND ARIZONA *SCAPHINOTUS*,
AND DESCRIPTION OF A UNIQUE DESERT CANYON
(COLEOPTERA: CARABIDAE)

SCOTT McCLEVE

2210 13th Street, Douglas, AZ 85607

ABSTRACT

A specimen tentatively determined as *Scaphinotus petersi catalinae* Van Dyke, collected in Aravaipa Canyon, Graham County, Arizona, and apparently representing an isolated population, is compared with typical *S. p. catalinae* and the other 5 subspecies of *S. petersi* Roeschke. Aravaipa Canyon is described as a rich but apparently seldom visited collecting area, and sketch maps are provided.

This note is prompted by the capture of a single male *Scaphinotus petersi* Roeschke specimen in Aravaipa Canyon in extreme western Graham Co., AZ. In midafternoon on 10-VI-75 at the junction of Aravaipa and Turkey Creeks (see Fig. 1-B) the beetle was found resting on moist sand and gravel under a flat rock at the stream margin. It struggled when captured—apparently neither in diapause nor suffering from desiccation in spite of the clear, hot (ca. 35° C.) weather typical of the driest time of year in this desert canyon. The beetle may be slightly teneral, which, together with the early summer collecting date, poses questions of when the season of adult activity might occur. The intact, unabraded condition of the specimen argues against its having been accidentally transported there from further upstream.

I was unaware of the significance of this record until George E. Ball examined the beetle later in 1975. He had reported (Ball 1966) that *Scaphinotus* in Arizona seem to be restricted to the moist, coniferous mountain canyons from about 1830 m upwards. The elevation at the mouth of Turkey Creek, by contrast, is about 930 m. Ball was sufficiently interested to visit the locality in August that year, and has made 2 subsequent stops there (July, 1976 and August, 1977), but has found no additional specimens (pers. comm.). I have made 3 other trips—in June, July, and August—without finding more. Donald Chandler searched for *Scaphinotus* while making a survey of the insects of the area for the Bureau of Land Management, but likewise found none (pers. comm.).

Recently Ball examined and measured the Aravaipa specimen, and made comparisons with the males of the 6 named subspecies of *S. petersi*: *S. p. petersi* Roeschke, *S. p. catalinae* Van Dyke, *S. p. biedermanni* Roeschke, *S. p. grahami* Van Dyke, *S. p. corvus* Fall, and *S. p. kathleenae* Ball. The 7 characteristics used by Ball (1966) to compare the subspecies yield the following values or states when applied to the Aravaipa specimen: 1) total length: 16.08 mm; 2) ratio of the length of the pronotum/the length of the posterior prolongations of the pronotum: 3.25; 3) ratio of the width of the head across the eyes/the maximum width of the pronotum: 0.402; 4) punctuation of the pronotum: impunctate; 5) sculpture of the pronotum: smooth;

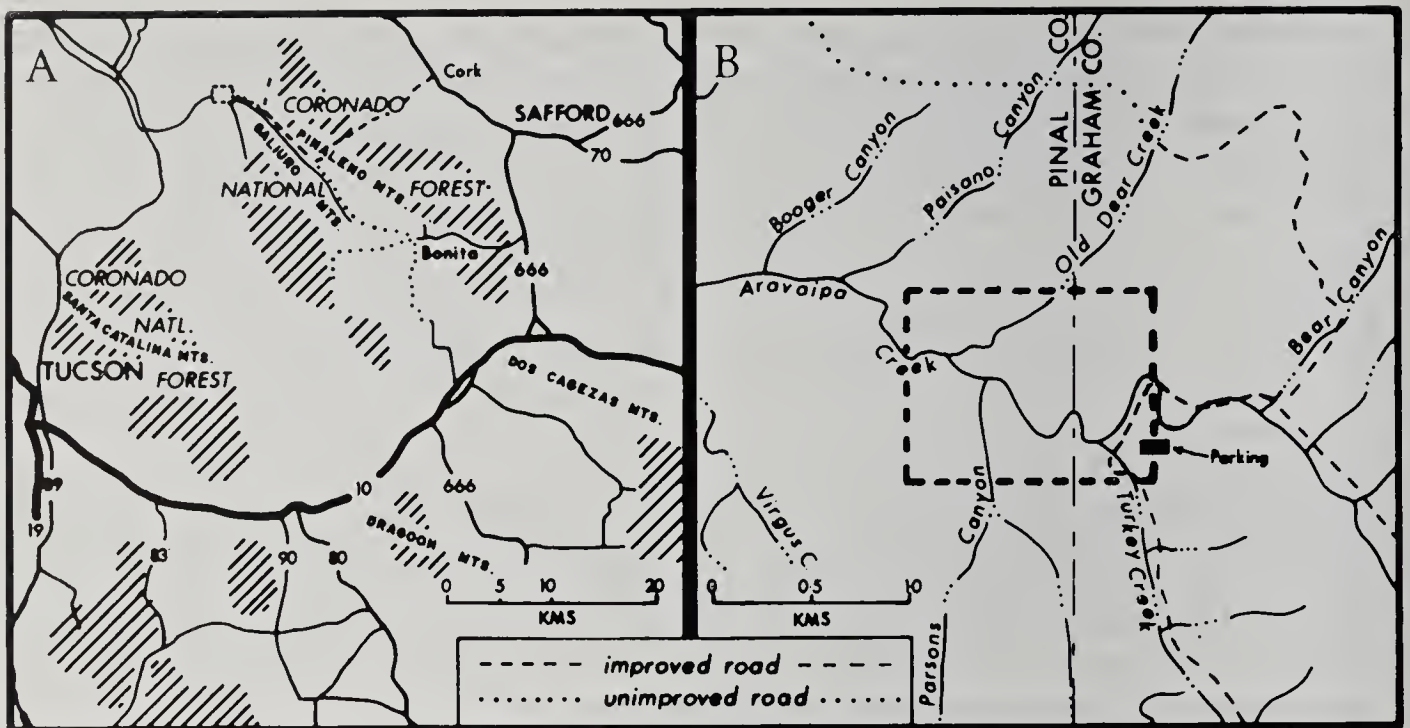


Fig. 1. A, General map of mountain ranges and roads associated with Aravaipa Canyon; B, Detail map of the vicinity of the east end of Aravaipa Canyon.

6) sculpture of the elytra: intervals flat, punctures not connected by striae; and 7) total number of grooved articles on both hind tarsi: none. (In addition, the specimen is purple, without evidence of setae or punctures on the lateral pronotal margins.)

The Aravaipa specimen clearly differs from *p. grahami* and *p. corvus* in 5 of the 7 characteristics, and differs from *p. kathleenae* in 3 characteristics. (However, the impunctate pronotum of the Aravaipa specimen is most like that of *p. kathleenae*, the only subspecies without such punctures in all known specimens.) It differs from *p. petersi* in 2 characteristics.

On Ball's scatter diagram (1966, plate 57) the Aravaipa specimen is within the areas of variation circumscribed for the Rincon Mts. *p. biedermani* population and the Soldier's Camp Santa Catalina Mts. *p. catalinae* population. The impunctate pronotum is the single characteristic of the 7 that separates the Aravaipa specimen from *p. biedermani* and *p. catalinae*. Ball chose the more variable *Scaphinotus petersi catalinae* Van Dyke as the best tentative determination, relying partly on geographical proximity (pers. comm.).

In his 1966 paper Ball inferred that *Scaphinotus* was able to inhabit and disperse through the lowlands, at least through the riparian corridors, during the moist, cool pluvial periods of the Pleistocene; the presence of *S. petersi* in Aravaipa Canyon strongly supports this inference. Also, since Aravaipa Canyon is about halfway between the Santa Catalina Mts. (*p. catalinae*) and the Pinaleno Mts. (*p. grahami*), and directly in the communicating riparian corridor that seemingly would have permitted dispersal of *petersi* stock between these 2 ranges during pluvial periods, the presence of a current population very like *p. catalinae* in Aravaipa Canyon, and rather unlike *p. grahami*, makes possible the further inference that these 2 subspecies were not in contact during the last pluvial period. Pluvial Lake Cochise, as described by Martin (1963), at the western base of the Pinaleno Mts. may have contributed to the continued geographic separation of the 2 subspecies even though the prevailing mesic conditions favored dispersal.

In the remaining paragraphs, the east end of Aravaipa Canyon and adjacent Turkey Creek Canyon (see Fig. 1-B) are described for the benefit of others who might consider collecting there. Hopefully, enough *Scaphinotus* specimens will be discovered to permit an analysis of this population.

The greatest part of Aravaipa Canyon (12.1 km) has been protected since 1969 as the Aravaipa Canyon Primitive Area, administered by the Bureau of Land Management. Additional adjacent areas have been proposed for addition to the Primitive Area, and probably will be added soon. Vehicular traffic and firearms are prohibited, all vertebrates are protected, and BLM personnel are concerned about the welfare of all life forms in the area; species lists are being compiled. This drainage is perhaps most succinctly described as unique, rich in beetle taxa, accessible, and seldom visited by coleopterists. Aravaipa Creek, with populations of 8 native desert fish, is the least disturbed of all live streams in the Arizona portion of the Sonoran Desert. The high canyon walls and permanent water sustain large cottonwood, willow, sycamore, box elder, ash, oak, hackberry, and truly giant black walnut trees. Some of the trees support large vines of native grape. There are a few junipers, but no pines except for pinyon pines on the tablelands above the canyon. The more xeric exposures support *Yucca* and mesquite and other more typically desert species, including saguaro and other cacti.

Permits are needed to enter the Primitive Area, mainly to control the number of people using it at one time. Heaviest use is by birdwatchers and backpackers during the spring and fall, and on weekends. The lower elevation (ca. 732 m) west entrance, which I have not visited, is closer to a paved road and sees more use. Permits, maps, and other information are available from: Bureau of Land Management, Safford District Office, 425 E. 4th St., Safford, AZ 85546.

The dirt road into the east entrance is long, rough, and dusty, but passable for passenger cars. The last 0.8 km before the parking area is subject to periodic destruction by flooding of Aravaipa Creek during severe storms. The first crossing of Turkey Creek, just past the parking area, is seldom dry enough for passenger cars.

My own collecting in Aravaipa Canyon and Turkey Creek Canyon, mainly at black light, has yielded over 50 families of beetles. Besides the *Scaphinotus* specimen, other distinctive carabids include *Amblycheila baroni* Rivers, *Goniotropis*, *Pachyteles testacea* LeConte, *Pterostichus arizonae* Horn, *Pericompsus sellatus* LeConte, 8 spp. of *Schizogenius* and 7 spp. of *Brachinus*.

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SOUND PRODUCTION IN *AGONUM MARGINATUM* LINNAEUS AND *LORICERA PILICORNIS* FABRICIUS.

TREVOR G. FORSYTHE

Zoology Dept., University of Manchester, Manchester, England.

Our present knowledge of sound production in the Carabidae is rather scanty, but there is little doubt that it occurs in many more species than have been recorded, and in widely separated genera. To confirm this, all that is required is that collectors should observe and listen closely to their captures before consigning them to alcohol or the killing jar.

Sound production in *Agonum marginatum* occurs in a fashion similar to that described for *Cicindela tranquebarica* Herbst (Freitag and Lee 1972) and *Amara familiaris* Df. (Forsythe 1979). The beetle remains in a standing position with all 6 legs on the ground whilst the buzzes are emitted. The buzzing sound occurs only if the elytra are slightly raised. The wings, which are just visible beneath the raised elytra, can be clearly seen (using a binocular microscope) to vibrate as the sound is produced. No other visible movements have been noted. The sound is faint but distinct and lasts for approximately 3 seconds. Sound is produced when the beetle is first subjected to daylight under confined conditions, such as those imposed by a glass tube. Jeffrey Davies of Anglesey, Wales, recently has recorded *Loricera pilicornis* producing sound. He noted that the only indication given by the beetle that it was going to produce sound occurred when the elytra were opened slightly (personal communication).

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